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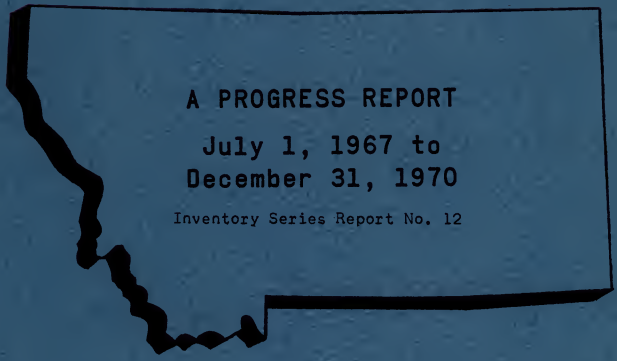
"A COMPREHENSIVE WATER AND RELATED LAND RESOURCES PLAN
FOR THE STATE OF MONTANA"



A PROGRESS REPORT

July 1, 1967 to December 31, 1970

Inventory Series Report No. 12

MONTANA WATER RESOURCES BOARD

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"A Comprehensive Water and Related Land Resources Plan for the State of Montana"

A PROGRESS REPORT

July 1, 1967 to December 31, 1970

INVENTORY SERIES REPORT NO. 12

December, 1970

STATE OF MONTANA

Forrest H. Anderson, Governor

Montana Water Resources Board

Douglas G. Smith, Director

Board Members

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Report Prepared by the Planning Division

The work upon which this report is based was supported primarily by funds provided by the Montana Legislature and with funds furnished by the Water Resources Council under Title III of the Water Resources Planning Act of 1965 (Public Law 89-80).

MONTANA WATER RESOURCES BOARD

SAM W. MITCHELL BUILDING
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59601

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DOUGLAS G. SMITH, DIRECTOR, HELENA
EVERETT REDEEN, FORSYTH
FRED E. BARRETT, CHESTER

January 1, 1971

The Honorable Forrest H. Anderson
Governor of Montana
State Capitol Building
Helena, Montana 59601

Dear Governor Anderson:

Transmitted herewith is the Progress Report of the Montana Water Resources Board concerning the State Water Plan. Title 89-132.1 of the Montana Water Resources Act of 1967 directed preparation of an extensive State Water Plan and requested that the plan or portions thereof be submitted to the biennial sessions of the Legislature.

The Board has attempted to present a factual accounting of time and effort expended thus far in preparation of the State Water Plan. In addition, recommendations drawn from the experience of the first three years are presented for legislative consideration.

I urge the legislature to give consideration to the recommendations made and take positive action regarding the future course of water resources planning in Montana.

Sincerely,

MONTANA WATER RESOURCES BOARD

Douglas G. Smith

Douglas G. Smith
Director

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INTRODUCTION

Montana's 1967 Legislature not only changed the name of the State Water Conservation Board to the Montana Water Resources Board, but it placed upon the Board the responsibility for preparing a comprehensive, multiple-use, statewide water plan. We expect that this plan will serve to indicate our State's water needs for the next 50 years. It will also permit future Governors and Legislative assemblies to choose from among alternate types of developments and water uses.

The basic plan is scheduled for adoption by the Board as portions of it are completed. A plan of this nature will, of course, never be finished, but must be dynamic and responsive to regular updating and implementation as new data are collected and new problems arise.

This publication, the twelfth in a series of Inventory reports published by the Planning Division of the Water Resources Board, will bring the reader abreast of the accomplishments of the state water plan to date.

The Montana Comprehensive Water Plan is a long range guideline to a program for the development and conservation of Montana's water and related land resources.

The ultimate objective of the plan is to recommend measures that would provide Montana with an adequate future water supply and enhance optimum beneficial use of the State's water and related land resources.

The urgency of preparing a comprehensive water plan arises from the increasing threats to claim water originating in or flowing through Montana for use in other areas of the nation. Such plans (referred to as interbasin transfer schemes) are growing in number and scale at an imposing rate; and they are not merely planners' ideas but are advanced to the point that several states are now studying methods of financing water diversion. The harsh impact of losing water through these

schemes would result in severe restrictions on Montana's capabilities to continue progressive development, and loss of the privilege to use water in the best interests of the state and people of Montana.

Thus a key aspect of the state water plan is to estimate Montana's potential in water development for all uses including domestic, municipal, industrial, agricultural, and recreational, and to evaluate means of assuring a supply for these uses. To accomplish this requires the efforts of a wide variety of programs which have been undertaken as work on the state water plan progresses:

1. Inventorying and classifying all water in the state.
2. Estimating population and per capita water needs.
3. Estimating industrial water requirements.
4. Determining agricultural productivity and irrigation potential.
5. Evaluating water project sites, costs and benefits.
6. Projection of the state's overall water requirements, adequacy of supply, and suggested actions to augment supply and solve problems.

HISTORY

First efforts at water resources planning in the state centered around the development of irrigated agriculture by the Bureau of Reclamation in the early 1900's. From 1919-1921, the Montana Irrigation Commission produced county by county plans for irrigation development. Creation of the State Water Conservation Board in 1934 resulted in considerable planning effort primarily on a project by project basis, again, irrigation oriented. Information began accumulating, however, which made it possible to supply background data on water development. One of the most important factors in supplying this information was the inauguration of the Water Resources Survey under the State Engineer in 1942. Without this survey (still being conducted under the Water Resources Board), it would be virtually impossible to have any reliable information concerning Montana's water use such as the number of irrigable acres under existing systems or an inventory of water rights for the protection of individuals in the state.

Under authority of the Flood Control Act of 1944, regional planning by federal agencies, chiefly the Bureau of Reclamation and the Corps of Engineers, was initiated. Comprehensive River Basin planning is continuing on the Missouri River under the guidance of the Missouri Basin Inter-Agency Committee and on the Columbia River under the Pacific Northwest River Basins Commission. Now composed of both federal and state representatives, these entities provided Montana with its earliest experience in multiple-use water resources planning.

The need for a comprehensive state water plan in Montana was recognized with the passage of Title 89, Chapter I of the Montana Code concerning waters and irrigation. This law, known as the Montana Water Resources Act of 1967, created the Montana Water Resources Board to assume the duties of the State Water Conservation Board, the Carey Land Act Board, and the State Engineer's Office. Even

the name change reflected the change in direction and purpose -- from "Conservation" of water through irrigation to a total concern for full utilization of our water "Resources" through comprehensive multiple-use planning.

Inventory Series Report No. 4, Montana Resources and Planning, presents the major points of the 1967 Act and the charge to the Montana Water Resources Board in development of the state water plan. This report outlines the plan framework and emphasizes the need to coordinate the plan with other planning efforts effecting the State.

Neighboring states have also initiated the development of state water plans which may eventually be incorporated into a Western States Water Plan being developed by the Bureau of Reclamation.

Briefly we have stated the purposes for undertaking the development of a state water plan and the history preceding current development. Comprehensive water resources planning is relatively new to Montana, but much information and experience has been developed in the past which can be used in this endeavor.

DESCRIPTION OF THE STATE WATER PLAN

The Montana Water Resources Act of 1967 (Title 89-101.2, Montana Code) states that the "public policy of the State is to promote the conservation, development, and beneficial use of the State's water resources to secure maximum economic and social prosperity for its citizens" and clearly designates the Montana Water Resources Board as the action State agency which shall "coordinate development and use of the water resources of the State so as to effect full utilization, conservation and protection of its water resources." The Water Resources Board in another section of the Act (Title 89-132.1) was charged with the preparation of "a continuing comprehensive inventory of the water resources of the State" and of

"a comprehensive co-ordinated, multiple-use water resources plan".

OBJECTIVES AND SCOPE

The general objectives of the plan are clearly defined by the State policy statement quoted above and by the description of the plan in the law - "the state water plan shall set out a progressive program for the conservation, development, and utilization of the State's water resources, propose the most effective means by which these water resources may be applied for the benefit of the people, with due consideration of alternative uses and combinations of uses."

The state water and related land resources plan is being developed in four phases (see table 1) that form a rational and logical framework which clearly defines the scope of the plan. These include:

(1) An inventory phase which will result in accumulation of detailed knowledge of the resource and present management and use of it. Involved in this phase is computerizing of all raw data in a storage and retrieval system, known as the Montana Water Resources Data Center, which will allow easy and rapid use of our water information in many ways including current and subsequent phases of the water plan.

(2) A water requirements and projection phase, the results of which, when balanced against the inventory will allow the Board to estimate surpluses and deficiencies and to project and recommend developments for the future. Concentration of initial work in this phase will be on the early period up to 1980 for which relatively realistic projections can be made. However, the Board will develop projections for the years 2000 and 2020 in order to be in line with other planning now taking place in the West.

STATE WATER PLAN

Phase I - Inventory

1. Accumulation of knowledge of present management & use
2. Computerization of raw data
3. Consideration of significance of related resources
4. Coordination with other planning efforts
5. Inclusion of current developments, studies & action
6. Publication of Inventory Series Reports

Phase II - Water Requirements

1. Estimation of surpluses & deficiencies in each basin
2. Estimation of surpluses & deficiencies for the whole state
3. Projections of present & future water needs to 1980, 2000, 2020
4. Definition of problems

Phase III - Recommended Developments

1. Propose long & short-term developments to meet projected water needs of Phase II
2. Recognizing past developments, present demands, future needs for municipal, irrigation, power, recreation, & flood control

Phase IV - Implementation

1. Based on present supply & demand
2. In accordance with other planning efforts
3. Considering future supply & demand

Table I

(3) A phase recommending developments to be accomplished between the present and 1980 and by the years 2000 and 2020. These recommended developments will be conditioned not only by the finding of the inventory and requirements phases of the state water plan but by the coordination of these findings with the work of the other planning agencies, especially the comprehensive statewide plan being established by the State Department of Planning and Economic Development.

(4) An implementation phase, early segments of which may well be developed within the next two years with later segments developing as results accrue from the preceding three phases of the state water plan and other concurrent planning efforts.

Working within this scope and toward the objectives defined above, the state water and related land resources plan is clearly a program that will stimulate knowledgeable thought and discussion which in turn will result in continuing refinement and modification. It should, therefore, be a dynamic plan, flexible enough to accommodate changes as they develop and adjustments as circumstances dictate. As recommendations for development or other action are made, they should include enough detail to indicate clearly the objectives, required actions, alternatives, priority, and effects involved in the action so that the most urgent water and land resource problems are met and effectively answered first.

Among the early results of the plan are included:

(1) Clear definition of the most urgent problems of water resources development.

(2) An accurate knowledge of the resource and its relative significance with regard to other resources of the State.

(3) Definition and adoption of a framework that allows development of both short and long-term recommendations for optional development and management of Montana's water resources.

(4) Coordination and reconciliation of the framework plan with other planning efforts by local, State and Federal organizations.

(5) Coordination and inclusion of current developments, studies, and action within the plan.

(6) Production of summary progress reports to the public made as the plan develops. With regard to this last item, a series of reports on the inventory phase of the plan are now being written and, as they are completed, are being published.

ORGANIZATION

The Montana Water Resources Board, as organized to provide better collection of information and service to the people of the State of Montana, is comprised of four separate divisions, each working together for the benefit of all. The directors of these four divisions, administration, engineering, water resources, and planning, make up the Plan Formulation Committee which, with the aid of consultants, is the policy setting body providing technical guidance and assistance to the Planning Division concerning the state water plan.

Besides the Plan Formulation Committee, many state agencies contribute time and resources to the planning effort. Fifteen agencies have ongoing programs in water resources and thirteen of them expend appreciable funds on these programs.

As was required by the enabling legislation, the planning staff of the Montana Water Resources Board was organized and is conducting the water plan de-

velopment. The first year of operation was consumed in acquiring staff, inventorying existing data, formulating the framework, and participating in other planning efforts, primarily those of the Missouri Basin Inter-Agency Committee (MBIAC) and the Pacific Northwest River Basin Commission (PNWRBC).

Dr. George B. Maxey, Director of the Water Resources Research Center, Desert Research Institute of the University of Nevada, was hired as a consultant to the Water Resources Board to aid in formulating the framework for the plan and in directing the movement of first phases of its development. Under Dr. Maxey, the first inventory series reports were published, the first hearing held, and considerable data collected for future use.

Extensive work was involved in preparation of extensive river basin studies in the Missouri and Columbia River drainages and these plans, when completed, will contribute greatly to the substantive matter in the state water plan. Several staff members serve on various task force and subregional committees of these studies and great amounts of time were consumed by their participation over the past several years.

During the second year of operation the above activities were amplified, a procedure for reporting on the work was set in motion and the plan framework was adopted. Appropriate meetings to further inform the public were planned and held and some progress was made toward determining future water needs, (Phase II of the framework plan).

This past year, the third year of development for the plan , the river basin studies occurring within Montana are nearing completion and the collection of material under the Inventory Phase is providing needed information for the beginning of the Water Needs Study, Phase II. The Montana Water Resources Data Center

was enlarged to accommodate nine areas of study and the publications of collected data are increasing to provide needed inventory information. Land classification, groundwater and surface water programs along with the proposed formation within Montana of two conservancy districts are providing additional input into the state water plan.

PROGRESS ON DEVELOPMENT - INVENTORY PHASE

Publications

Efforts over the past three years have largely concentrated on the resource inventory, Phase I, which at present is nearly 85% complete. Upon incorporation of data collected by the Water Resources Field Survey Teams through the next field season, some 98% of the inventory will be completed. As proposed under Phase I, the inventory series would result in approximately sixteen publications. Five of these were completed in 1968-69 fiscal year and three were completed in 1969-1970 fiscal year. The Inventory Series include:

No. 1 "Directory of State of Montana, Federal Agencies, and Private Groups Active in the General Field of Water Resources".

No. 2 "Water Resources Programs conducted by Government Agencies in Montana".

No. 3 "Montana Register of Dams", A compilation of storage reservoirs having a capacity of 50 acre feet or more.

No. 4 "Water Resources and Planning", An explanation of the State Water Plan, its authorization, scope, and objectives.

No. 5 "Montana Water Laws: A Resume' "

No. 6 "Catalog of Stream Gaging Stations", A schematic approach to historical collection of stream discharge records.

No. 9 "Summary of Potential Projects in Montana", A compilation of anticipated future developments for water storage and control projects by drainage basin.

No. 10 "Bibliography of Montana Water Resources and Related Publications".

Recently published in the early part of fiscal year 1971 were three additional inventory series and a revision of Inventory Series No. 1. These include:

No. 11 "An Atlas of Water Resources in Montana by Hydrologic Basin", A 15 map atlas of Montana's drainage basins and resources.

No. 12 "Montana's State Water Plan, A Progress Report", A progress report to Montana's 42nd Legislature.

No. 16 "Groundwater in Montana", A report by Miller Hanson of the Montana Bureau of Mines and Geology on Montana's groundwater resources.

Future plans call for the remaining five publications to be completed as the expertise is available to compile the needed data. These include:

No. 7 "Economic Aspects of Water Development"

No. 8 "Patterns of Water Management and Administration"

No. 13 "Inventory of Water Use"

No. 14 "Inventory of Related Land Resources", A land classification report for Montana.

No. 15 "History of Water Development in Montana"

Additional publications may be prepared as necessity warrants.

While discussing the Inventory Phase, it is worth mentioning the county water resources survey reports and how that program has been expanded and accelerated to fit the schedule for the state water plan. The information in these reports now includes land classification and a review of groundwater resources. The completion schedule for these reports has been moved up to the end of 1971 with resurvey hopeful on those counties first surveyed in the 1940's. (See Table II)

Water Resources Data Center

In 1967, with the initiation of the state water plan, the Montana Water Resources Data Center was established. Through the use of the computer center of the Data Processing Section of the Department of Administration, the Water Resources Board has established a total of nine storage programs relating to Water Resources Board projects or related areas of administration and planning. These nine programs are discussed as follows:

WATER RESOURCES SURVEY

YEAR	COUNTIES SURVEYED	DATE PUBLISHED
1942	Yellowstone	1943
1945	Stillwater	1946
1946	Big Horn	1947
1947	Custer, Rosebud	1948
1948	Golden Valley, Musselshell, Wheatland	1949
1949	Meagher	1950
1950	Park, Sweet Grass, Treasure	1951-1950-1951
1952	Gallatin	1953
1954	Deer Lodge, Silver Bow	1955
1955	Broadwater, Jefferson	1956
1956	Lewis & Clark	1957
1957	Ravalli	1958 (Reprinted in 1965)
1958	Granite, Powell	1959
1959	Carter, Fallon, Madison, Missoula, Wibaux	1960 (Madison Reprinted 1965)
1960	Cascade, Powder River	1961
1961	Teton	1962
1962	Judith Basin, Lake	1963
1963	Chouteau, Pondera	1964
1964	Flathead, Lincoln	1965
1965	Carbon (Resurvey)	1966
1966	Blaine, Hill	1967
1967	Phillips, Valley	1968
1968	Glacier, Liberty, Mineral, Toole, Sanders	1969
1969	Dawson, Fergus, Prairie, Richland	1970 - Prairie
1970	Daniels, Garfield, McCone, Roosevelt Sheridan	None
1971	Beaverhead, Petroleum	None

Table II

The Engineering Division, in 1967, with the study of the proposed Tongue River Reservoir expansion, developed a Model Reservoir simulated computer exercise to project and analyze data relating to construction of a project of this magnitude. Also in 1967, an employee on the Economics Staff conducted a population study in which projections were made relating to Montana's economic aspects and social and economic development.

To aid in the dissemination of information to be published under the state water plan, a name and address mailing set was computerized to enable faster addressing of printed matter numbering upwards of 2000 copies. This mailing list is continually updated and revised to attempt to reach all those people interested in Montana's Water Development.

In 1968, the economics personnel began a regression analysis of economic variables affecting Montana's economic base, but discontinued their efforts upon initiation of the Statewide Economic Base Study by the Bureau of Business and Economic Research at the University of Montana in Missoula.

With collection of data under the Inventory Series, five additional storage and retrieval programs were initiated to aid in planning efforts. Surface water appropriations are being tabulated from field forms and appropriation forms and entered to computer tape for the purpose of tying the use of water to irrigated land or commercial and domestic use. This program demonstrates the intense need for a central filing agency for water rights and the need for water right revision in Montana's future.

Through a cooperative program with the U.S. Geological Survey, the stream discharge records for the entire State of Montana are being processed and stored

in the Data Center for Water Needs Planning. A stepped up program was initiated to store all available information on the Musselshell River and tributaries for basin planning and this data was forwarded to Washington D.C. for inclusion in the 1970 streamflow data being processed by the U.S.G.S. By July 1972, it is hoped that all streamflow records for the State of Montana will be available for planning use. Records on the Yellowstone River Basin are being forwarded as they are received to the Joint University Water Resources Research Center in Bozeman for inclusion in the Simulation Model being developed there.

A program was developed and is being utilized to store pertinent construction data relating to existing water storage projects and to facilitate the storage of known information relating to potential projects being investigated or under investigation in the past.

As the Land Classification Section completes the reconnaissance land classification study throughout the State, the acreage information is keypunched to data cards for calculation and evaluation. When completed, an accurate account of presently irrigated and potential irrigable land will be available for planning and river basin evaluation. Future plans call for a more comprehensive land classification study to determine problem areas and to study possible future development of water use and land development.

Under a contract with the Water Resources Board, the Montana Bureau of Mines and Geology and the School of Mineral Science and Technology in Butte have developed a program of storage and retrieval of all published groundwater well data for the State of Montana. This program and a duplicate deck of cards have been forwarded to Helena and adapted for use on the IBM 360-40 computer. Now underway is the

computerization of all unpublished groundwater well data and the use of a certain portion of this information for detailed studies. These studies include problem groundwater areas, control areas, and future planning and development of groundwater supplies for agriculture, municipalities, and industry. To facilitate the location of groundwater wells and use of the data collected, the school has developed a unique system of conversion of latitude and longitude to township, range, section, and 1/4 sections which has been made available to the Data Center. This program is adaptable to many areas of study and is efficient for over 80% of the State's area.

The Montana Water Resources Board has entered into an agreement with the Department of Planning and Economic Development, the Department of Health, the Highway Department, and the University System, for development of a File Management System, to utilize the 1970 Census Data being stored on computer tape. The 1970 Census Data, a major portion of which will only be available on computer tape, is to become available to the State for use via the Mark IV Data Acquisition Center purchased by member agencies and operated by the Data Processing Center of the Department of Administration in the Sam W. Mitchell Building, Helena.

With the use of this census information, and the past population and economic base projections, it will be possible to provide up-to-date factual economic and social development information for Montana and areas of study throughout the State.

Future development, modification, and utilization of these computer programs and the Data Center depends greatly upon the demand for detailed planning and changes in Montana's future water utilization policies. As various aspects of the

water development plan for Montana become realistic, it will prove useful to have records on hand which are accessible and readily usable in a central file or location rather than spread throughout multiple agencies and locations in the State.

Contracted Services

To develop phases of the water plan, and to secure information which is not readily available to our planning personnel, the Montana Water Resources Board has entered into eight contracts with various persons or groups which will aid the Board in establishing the water plan.

1. An agreement was reached with the University Joint Water Resources Research Center at Montana State University in Bozeman to develop a river basin simulation model on the large Sigma 7 Computer at the University. The Office of Water Resources Research of the Federal Government provided most of the funding for development of this model with completion expected in June 1972. The basic idea is to have a method for studying the impact of water development by imposing changes on known conditions of a drainage area. The model is being developed to analyze the different changes and provide the ability to evaluate altered conditions in a short time.

2. Financial and technical assistance was provided by the Montana Water Resources Board and the Department of Planning and Economic Development for the development of an Economic Study conducted by the Bureau of Business and Economic Research at the University of Montana in Missoula. This report, published in June of 1970, establishes certain basic criteria and provides a review of past trends and patterns of economic and social development in the State of Montana.

3. The Water Resources Board has also provided financial assistance to the Montana Bureau of Mines and Geology and the School of Mineral Science and Technology in Butte for groundwater studies and water quality information. The efforts of participating personnel have resulted in one inventory publication on groundwater and valuable data for inclusion in our computer storage facilities.

4. The services of Dr. George Burke Maxey, an internationally famous hydrogeologist, and assistant director of the Desert Research Institute of the University of Nevada, were obtained by the Board in early 1968 and he has proven a valuable consultant in establishing direction and continuing progress of the state water plan.

5. Mr. Dave Cawlfield, retired Soil Conservation Service Chief Soil Scientist, was retained as a consultant in developing a land classification and inventory for Montana.

6. After studying the data available concerning several river basins in Montana, an agreement was entered into with the Desert Research Institute of the University of Nevada at Reno to aid in the preparation of a water management model to be developed from water resources material on the Bitterroot River and Clark Fork River below the Bitterroot to St. Regis. (See Figure 1) This dynamic model will pave the way for other basin plans which will show the areas of greatest need for water, the best possible methods for satisfying those needs, and the optimum levels of development under present and future demands. (See Table III)

7. Montana's 41st Legislature provided a tool for further statewide planning in the form of water conservancy legislation passed in 1969. Under Senate

Bitterroot - Clark Fork
Study Area
MINERAL
RAVALLI
MISSOULA

Figure 1

DATA FLOW SHEET FOR BASIN MODELING

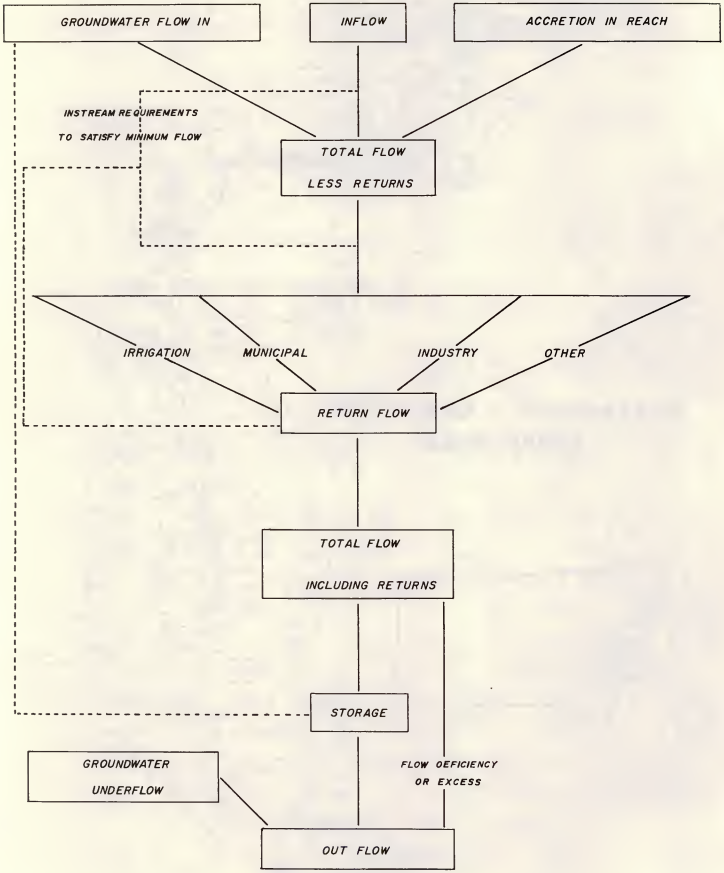

Table III

Bill 67, the Montana Water Resources Board was authorized to study or provide the means for study upon the request for organization of water conservancy districts within the State of Montana.

With the request of the representatives of nine north central Montana counties, the Board authorized a preliminary study on the proposed conservancy district and shortly thereafter approved the request of four eastern Montana counties for a preliminary study of another proposed district.

These two studies will provide the basis for possible future studies of these two areas, and will assemble valuable data concerning water needs and development for the state water plan. Any additional studies concerning these or other proposed conservancy districts will serve to contribute further data to efforts of the Water Resources Staff in development of the state water plan.

Future conservancy district planning centers on the headwaters of the Missouri River area in Southwestern Montana where a request was generated for another preliminary study for a proposed conservancy district to cover all or parts of seven counties. Study of this area depends on the providing of funds by the 1971 Legislature for this and future conservancy district planning.

8. In September, 1970, the Montana Water Resources Board approved entering into a contract with the Control Systems Research Incorporated of Arlington, Virginia, to study the feasibility of desalting water supplies in numerous eastern Montana communities.

The study, paid for entirely by a grant from the Office of Saline Water, Department of Interior, will serve the following purposes:

1. Provide a complete classification of communities in Montana where a potential presently exists for the application of desalting technology.
2. Identify communities not presently having a potential for the application of desalting technology, but for which a future need may arise.
3. Evaluate the present supply and demand balance of each of the communities identified in (1) and (2) above.
4. Select and justify the best desalting processes for each candidate community, based on technical and economic analyses.
5. Evaluate the economic impact of supplying desalted water to the selected communities, with respect to water quality improvement demands and to additional benefits, both tangible and intangible.

The efforts of this study will provide information not only to the communities involved, but to the Department of Planning and Economic Development, the State Board of Health and the Water Resources Board.

Regional River Basin Planning

Another type of assistance is gained from the Board's work on interstate major river basin planning for the Missouri and Columbia River Basins. From these the Board obtains experience in comprehensive planning, evaluates data and plans of Federal agencies, and injects the state's interests as much as possible into large regional plans.

In the Missouri River Basin this is done through the Missouri River Basin Inter-Agency Committee (MBIAC) and for the Columbia River Basin through the Pacific Northwest River Basins Commission (PNWRBC) and the Columbia-North Pacific Technical Staff (C-NP).

The Missouri River Basin Inter-Agency Committee has nearly completed work on the regional plan and final copies of the study are becoming available as they are published.

The Columbia-North Pacific Study is due for completion by 1972 when final printing of the various reports will begin. The Montana Water Resources Board has been especially involved in sub-regional planning and members of the staff have contributed a great deal to overall coordination of the plan. As these plans become available, pertinent data is used in developing the state water plan and acceptable information used to supplement that which is collected through the Planning Division's efforts.

Another basin planning effort undertaken by the Board in the last year involves the Type IV river basin planning conducted jointly by the Soil Conservation Service, Forest Service, and Economic Research Service of the U.S. Dept. of Agriculture in cooperation with the state.

The first Type IV planning effort in Montana involves the study of the Stillwater, Clarks Fork of the Yellowstone, and Bighorn Rivers in conjunction with the ongoing study of the same type in the State of Wyoming.

The Plan of Work has been prepared and basic data collection will result in several elements of information:

1. Studies and projections of economic development.

2. Translation of such projections into needs for water and related land resource uses on a national, regional and basin-wide scale.

3. Appraisal of water supplies both as to quantity and quality.

4. Appraisal of the availability of related land resources.

5. A description of the characteristics of present and future problems and the general approaches that appear appropriate for their solution.

6. Identification of projects and program elements which are feasible and should be initiated in the next 10-15 years.

The final report will indicate those systems of water management and related land use which can be developed in proper relationship to each other.

Upon the completion of the ongoing study, further studies have been requested on the Clark Fork of the Columbia, the Musselshell, and the Tongue and Powder Rivers in Wyoming and Montana. These basins will be considered for future study by the U.S.D.A. based upon recommendations by the state.

REQUIREMENTS AND PROJECTIONS PHASE

The Water Needs Phase of requirements and projections was initiated with the collection of field information concerning local, county, and statewide needs based upon past and future demands of water and land related resources. This phase will require the study of other planning efforts now being conducted in the state of Montana and the practical collection of data by contact with actual problem areas and the people involved in these areas.

Initial proposals called for analysis of all inventory data in generating Phase 2 of Plan Formulation. It appears, however, that some analyses could be undertaken on a subbasin basis as the inventories of the subbasins are completed.

This requires more coordination but could result in earlier development of the subsequent phases of plan formulation. With this in mind, a pilot series of informational meetings was conducted in the Bitterroot, Clark Fork, Flathead area of western Montana during the month of April, 1970. These meetings were designed to stimulate interest in the state water plan and elicit local expressions of the desirability and need for water and related land resource development. Although the information gathered is still being evaluated, it appears that these meetings achieved the desired effects. As time, staff, and budget permit, additional meetings of this type will be scheduled. It is hoped that this method properly used will help assure public acceptance of the plan as it evolves.

RECOMMENDED DEVELOPMENTS

Phase III of the water plan, recommended long range development, will be the result of activities by several agencies of state government.

Probably the largest impact upon Montana's resource development could stem from the possible creation of several proposed conservancy districts now under preliminary study by consulting firms within the state. (See Figure 2). The proposed North-Central, or Hi-Line Conservancy District, in Northern Montana involves the future development of Glacier, Toole, Pondera, Chouteau, Liberty, Hill, Blaine, Phillips, and Valley Counties and the projected movement of water through long expanses of canals across two and even three river basins.

The proposed East Central Conservancy District in Garfield, McCone, Richland, and Dawson Counties not only involves the development of adequate water supplies for domestic and agricultural uses but is concentrating on long range development of coal resources and the needed water supply for industrial development.

The proposed headwaters of the Missouri Conservancy District area involves

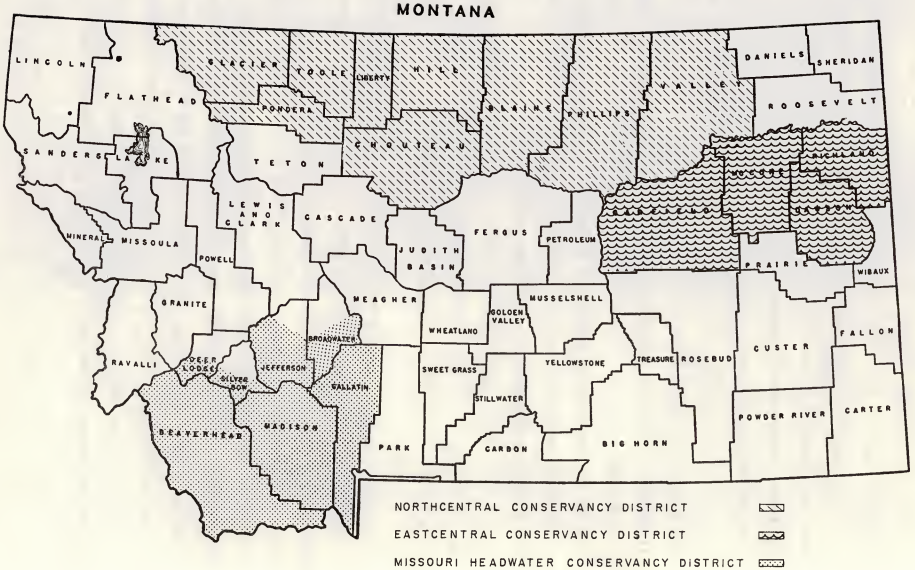
MONTANA
LINCOLN
FLATHEAD
SANDERS
LAKE
GLACIER
TOOLE
LIBERTY
HILL
BLAINE
PHILLIPS
VALLEY
DANIELS
SHERIDAN
ROOSEVELT
PONDERA
CHOUTEAU
TETON
LEWIS AND CLARK
CASCADE
FERGUS
PETROLEUM
MINERAL
MISSOULA
POWELL
JUDITH BASIN
PRAIRIE
WIBAUX
GRANITE
MEAGHER
MUSSELSHELL
GOLDEN VALLEY
WHEATLAND
FALLON
RAVALLI
DEER LODGE
BROADWATER
JEFFERSON
SILVER BOW
GALLATIN
SWEET GRASS
YELLOWSTONE
TREASURE
ROSEBUD
CUSTER
STILLWATER
BEAVERHEAD
MADISON
PARK
CARBON
BIG HORN
POWDER RIVER
CARTER
NORTHCENTRAL CONSERVANCY DISTRICT
EASTCENTRAL CONSERVANCY DISTRICT
MISSOURI HEADWATER CONSERVANCY DISTRICT

Figure 2

the most abundant source of water in Montana and will involve those projects and problems of the past, present, and future in a study to bring emphasis on the need for conservation and recommendations for the wise use of water. The areas proposed under this district include all of Beaverhead, Madison, and Gallatin, and parts of Jefferson, Deer Lodge, Silver Bow and Broadwater Counties.

The recommendations made as a result of conservancy district studies may form much of the backbone for Phase III of the plan.

Other changes too are taking place that may cause recommendations to be made which would never occur if conditions remained as they are today. Changes concerning the beneficial use of water for recreation and fish and wildlife could facilitate the need for changes in management of reservoirs and streams, while studies in eastern Montana concerning development of the economic and social conditions may result in the need for recommendations for changes in priorities of projects and water availability.

IMPLEMENTATION

After the Inventory, the Water Needs Study, and the Recommended Developments, the Implementation Phase of the state water plan will hopefully be accepted and development begun to insure the conservation and utilization of water in Montana.

Only through the cooperation of the Federal agencies, state government, and the people of Montana, will total water development in Montana become a reality.

Even as we attempt some implementation of water development each year, the future will require even larger and more extensive projects than have been attempted in recent years. It is the purpose of these planning efforts to justify needed developments and continue to update these efforts for future planning and implementation purposes.

PROBLEMS

A number of the problem areas have become evident thus far in the development of the state water plan. The primary problems involve the availability of funds and staffing.

Although funds were made available by the 1967 Legislature to fill several planning positions, a salary limitation based on that of the Director of the Board imposed a restriction on the salaries of new employees. Consequently, most of the planning positions were never staffed, the monies reverted, and the positions were eliminated. Recent attempts to recreate these positions have met with considerable opposition.

Since water resources planning is a relatively new field, there is a shortage of experienced personnel. The demand for these personnel, coupled with the shortage has created a competitive situation which Montana and states with similar budgetary restrictions cannot meet. Therefore, it has become necessary to employ the most qualified people available and train them to fill our needs. Again, without adequate funding, this training program is limited to what schools and training programs are readily available at a nominal fee for participation.

Without adequate funding, matching funds to acquire money for cooperative efforts in planning programs are not available and thus federal monies which could be obtained by the Board were utilized by those states with larger planning budgets.

Another problem involves the over-all coordination required in the state water planning program. The total program is designed to include all known agencies, organizations, and individuals with technical competence, responsibility, and interest in this field. It is the feeling of the Water Resources Board that the involvement of all available talent will result in greater public awareness and acceptance of the plan. However, this involvement is most time consuming. The cooperation, timing, and availability of information provided by these agencies

has not been specifically funded and has often been provided at the expense of their on-going programs. Cooperation is stressed in all interagency efforts, and great strides have been made in cooperative planning efforts among participating agencies.

Not necessarily a problem, but rather an opportunity, is the fact that this state water planning activity is the first major effort in Montana to consider water resources as they relate to the entire state. The staff of the Montana Water Resources Board welcomes the opportunity of working with all the people of the state to afford rural and urban interests, alike, the opportunities to cooperate for the benefit of all Montanans.

FUTURE DEVELOPMENT

The next two year's will entail the completion of the inventory phase and the incorporation of the data into the water needs study. From this water needs study a number of projections and recommendations will become evident which undoubtedly will require legislative action.

The publication of the five remaining inventory series and the completion of remaining county surveys will greatly increase the inventory of water and related resources in the state of Montana. Further grassroots meetings to investigate water needs are in store, those to date having produced several recommendations which are of value to the people of Montana.

The 42nd legislature will be asked to once again consider the adoption of a Montana Water Code and the recognition of recreation, and fish and wildlife as beneficial uses of water. The provision for Centralized Filing by the Board is a prerequisite to effective long-range planning of water resources.

Our dam safety laws need updating and strengthening to insure the continued operation of what water use projects we now have and to provide a central agency

for correction of problems.

Methods are being studied to develop a system of reservoir operation of water projects to better insure peak flood control protection while providing adequate storage for irrigation and recreation and maintenance of stream flow year-round.

With the perfection of the large Yellowstone River Basin model being developed under special contract, this model will be adapted to other basin problems.

Smaller basin modeling (as on the Bitterroot-Clark Fork Rivers) will hopefully result in the output of proven figures to back up any recommendations or projections which are made in the future.

It is essential that a thorough study is accomplished which will not be outdated before it is useful. Therefore, economic patterns and trends will be under continual study so as to provide the state water plan staff with a tool of management and reliability.

These are just a few of the foreseeable items involved in future development of the state water plan. Developments and projections do not always rationally fall into place, therefore, it is evident that this plan cannot be static , but must be updated and improved as water developments increase in scope with Montana's future.